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Olson et al.

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[54] **BACK HEIGHT ADJUSTMENT MECHANISM FOR A CHAIR**

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[73] Assignee: **HON Industries Inc.**, Muscatine, Iowa

[21] Appl. No.: **647,866**

[22] Filed: **May 15, 1996**

Related U.S. Application Data

[62] Division of Ser. No. 375,645, Jan. 20, 1995, Pat. No. 5,542,743.

[51] **Int. Cl.**[6] **B60N 2/22**

[52] **U.S. Cl.** **297/353**; 297/411.36

[58] **Field of Search** 297/353, 411.36, 297/410, 452.14

[56] **References Cited**

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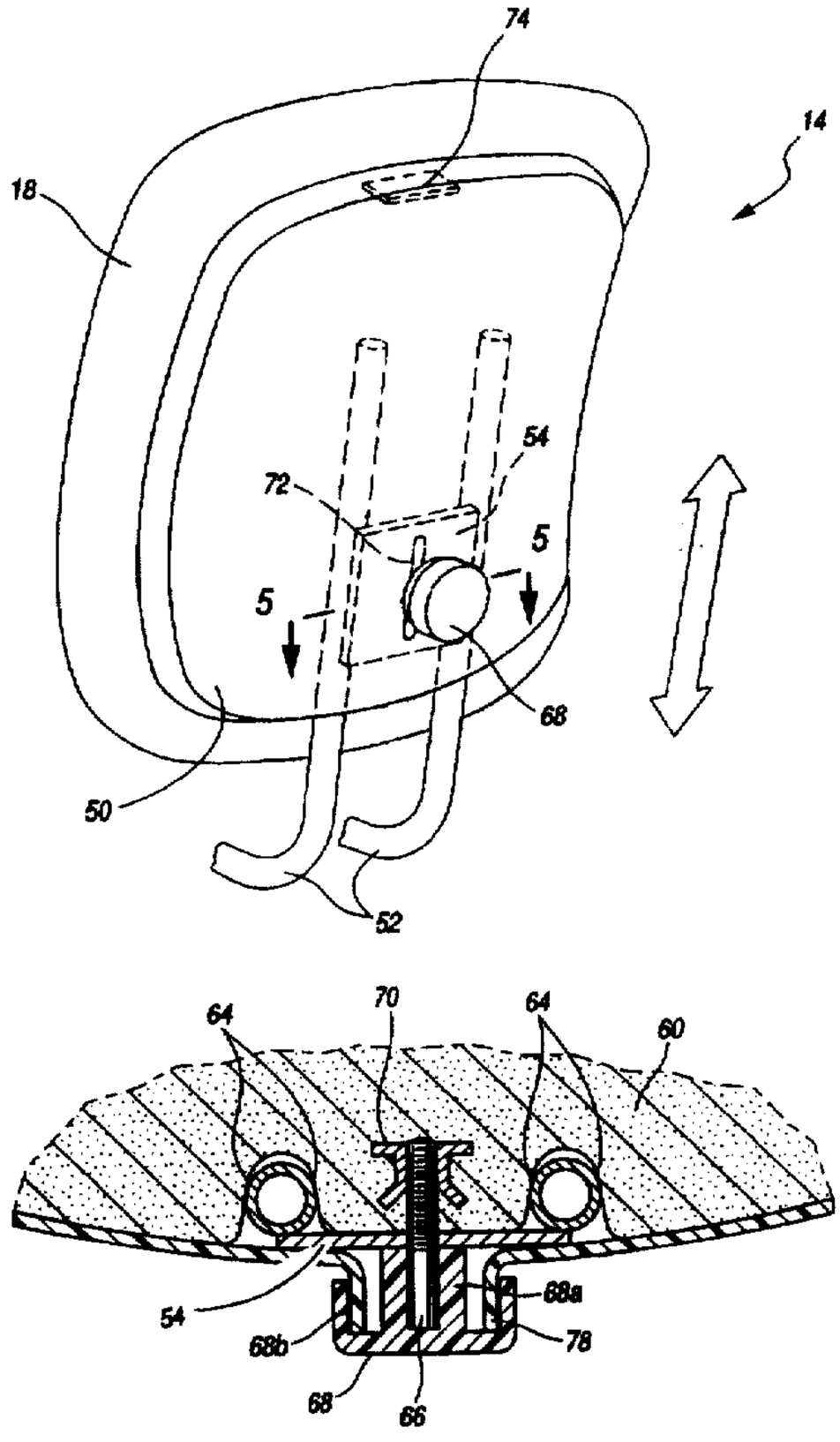
Assistant Examiner—Stephen Vu
Attorney, Agent, or Firm—Jones, Day, Reavis & Pogue

[57] **ABSTRACT**

A low cost task chair comprises a blow molded seat support member having a central planar portion for attachment of a control bracket. A recess in the planar portion beneath the control bracket receives a cross brace. A pair of arm support frames are secured to the ends of the cross brace and to the control bracket. The arms are, therefore, easily assembled to the chair with the cross brace concealed from view. A pedestal is secured to the control bracket and contains a gas cylinder for raising and lowering the seat assembly. Another recess is formed in the seat support member for receiving a flush mounted cylinder actuating lever. A seat back adjustment mechanism for adjusting the outward position of the back relative to the seat comprises a pair of parallel spaced tubular members telescopingly received by the control bracket. A blow molded back support is provided with wedge-shaped channels for receiving a pair of tubular members of a back support frame, thereby providing for a back height adjustment feature.

4 Claims, 6 Drawing Sheets



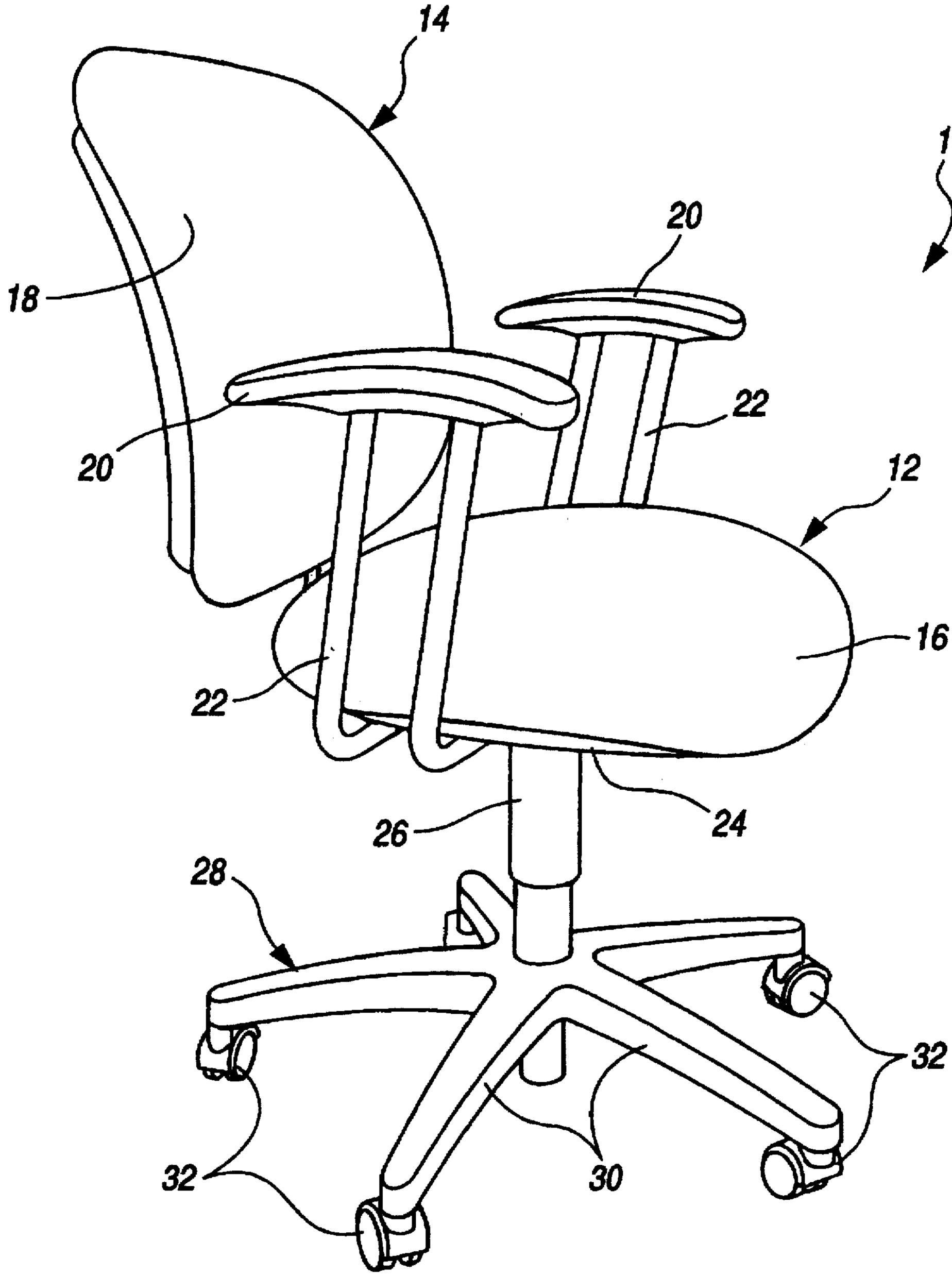
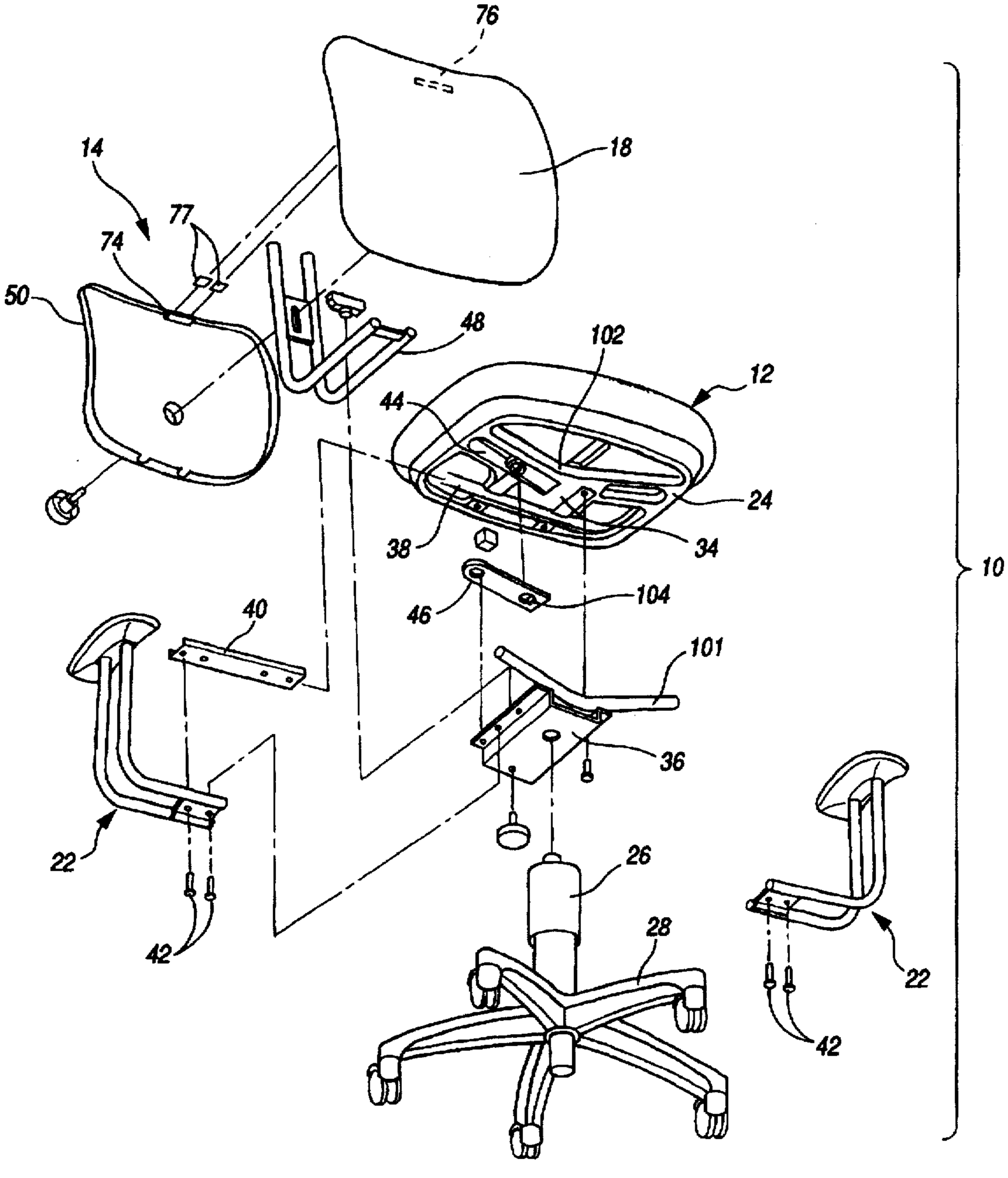


FIG. 1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14
18
77
74
50
48
102
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38
34
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36
22
26
28
42
22
42

FIG. 2

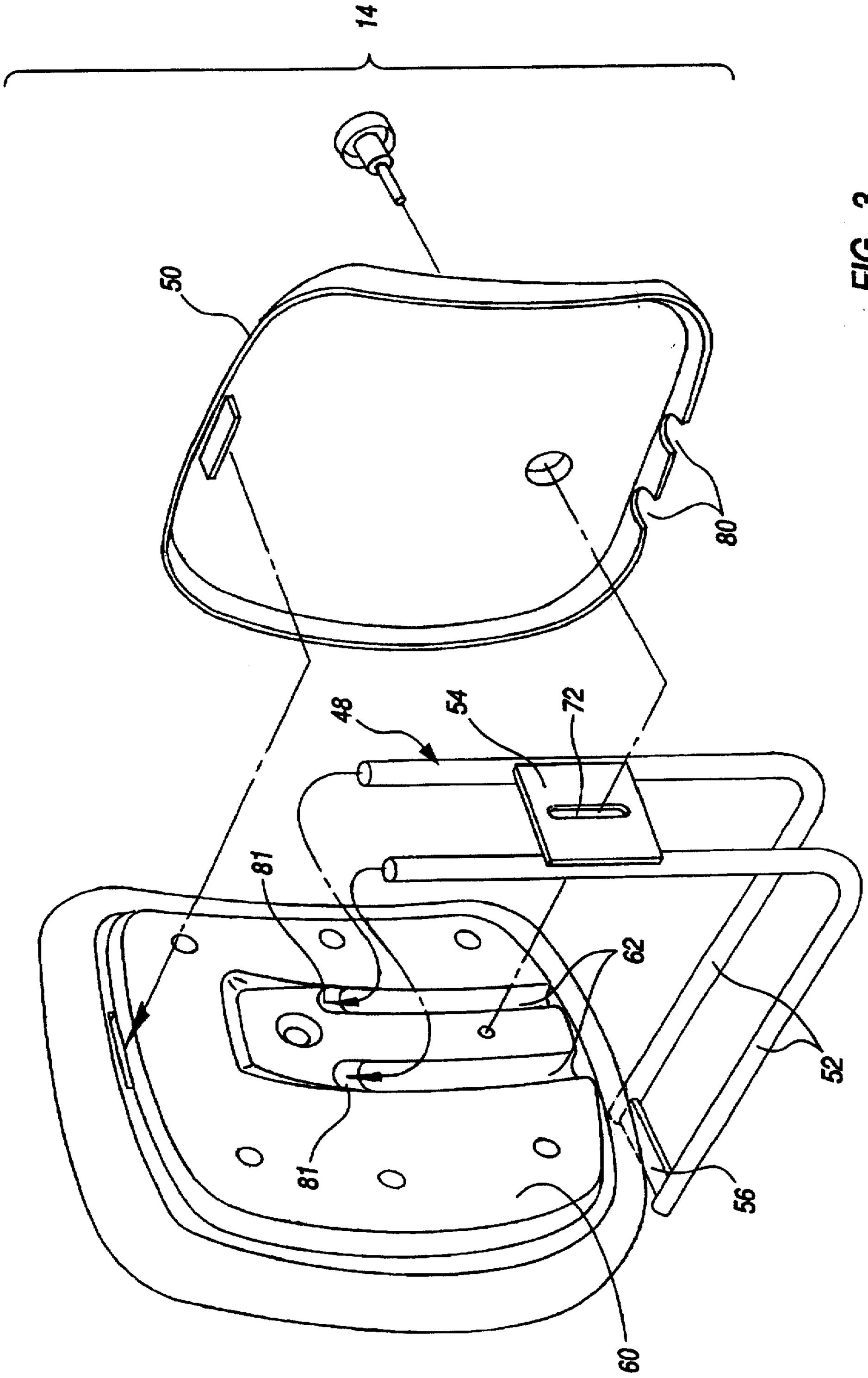

FIG. 3

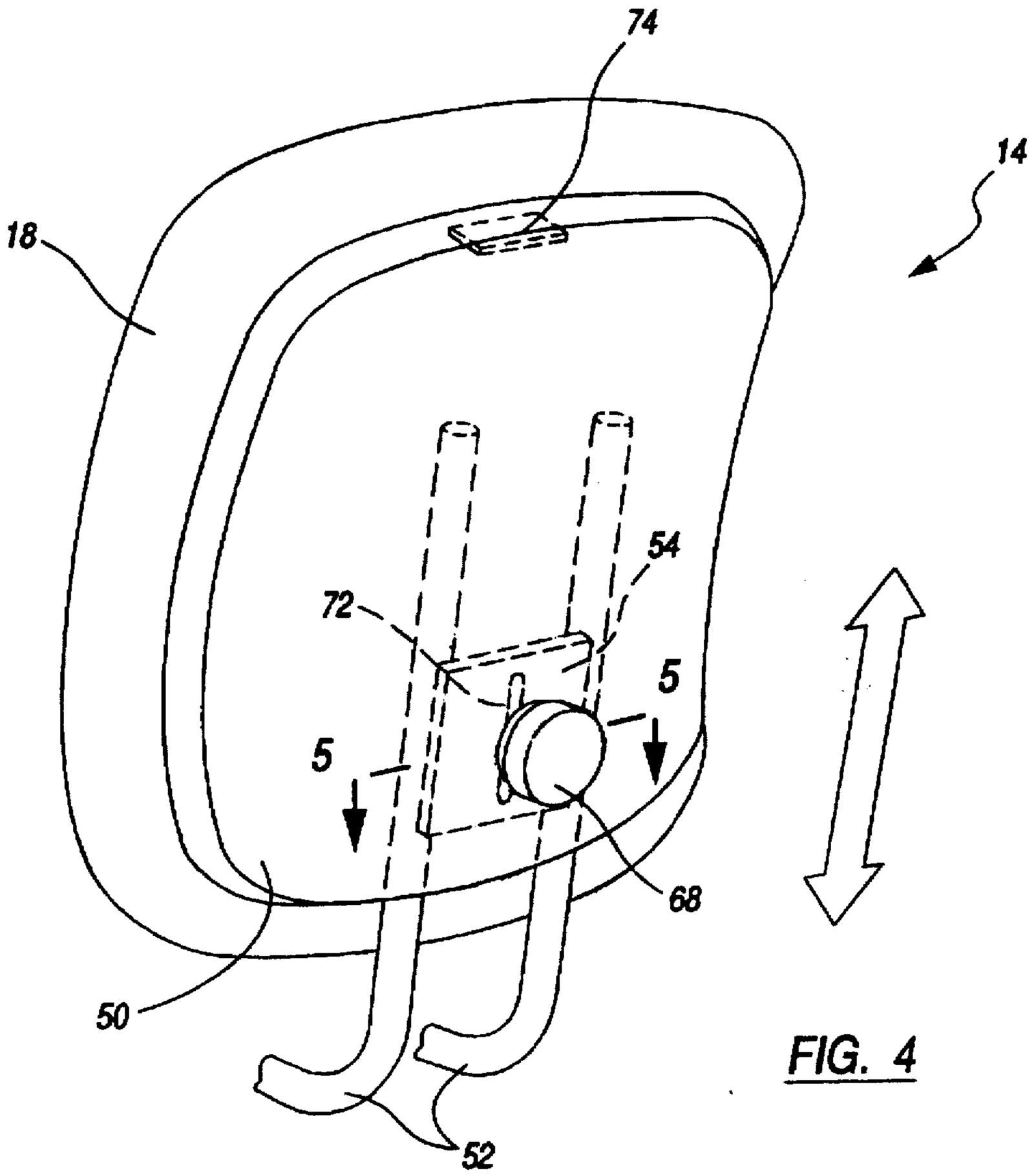

FIG. 4

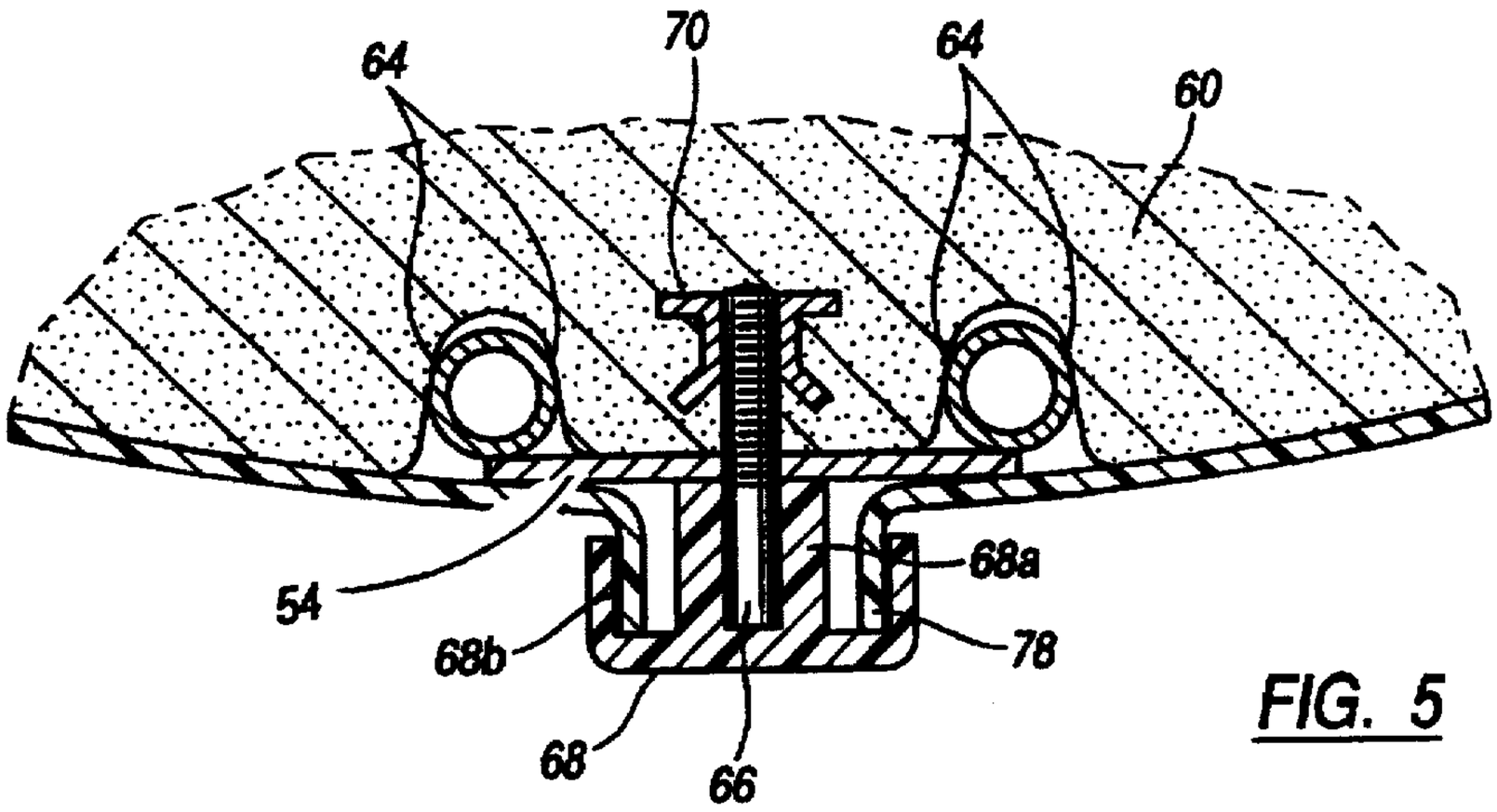

FIG. 5

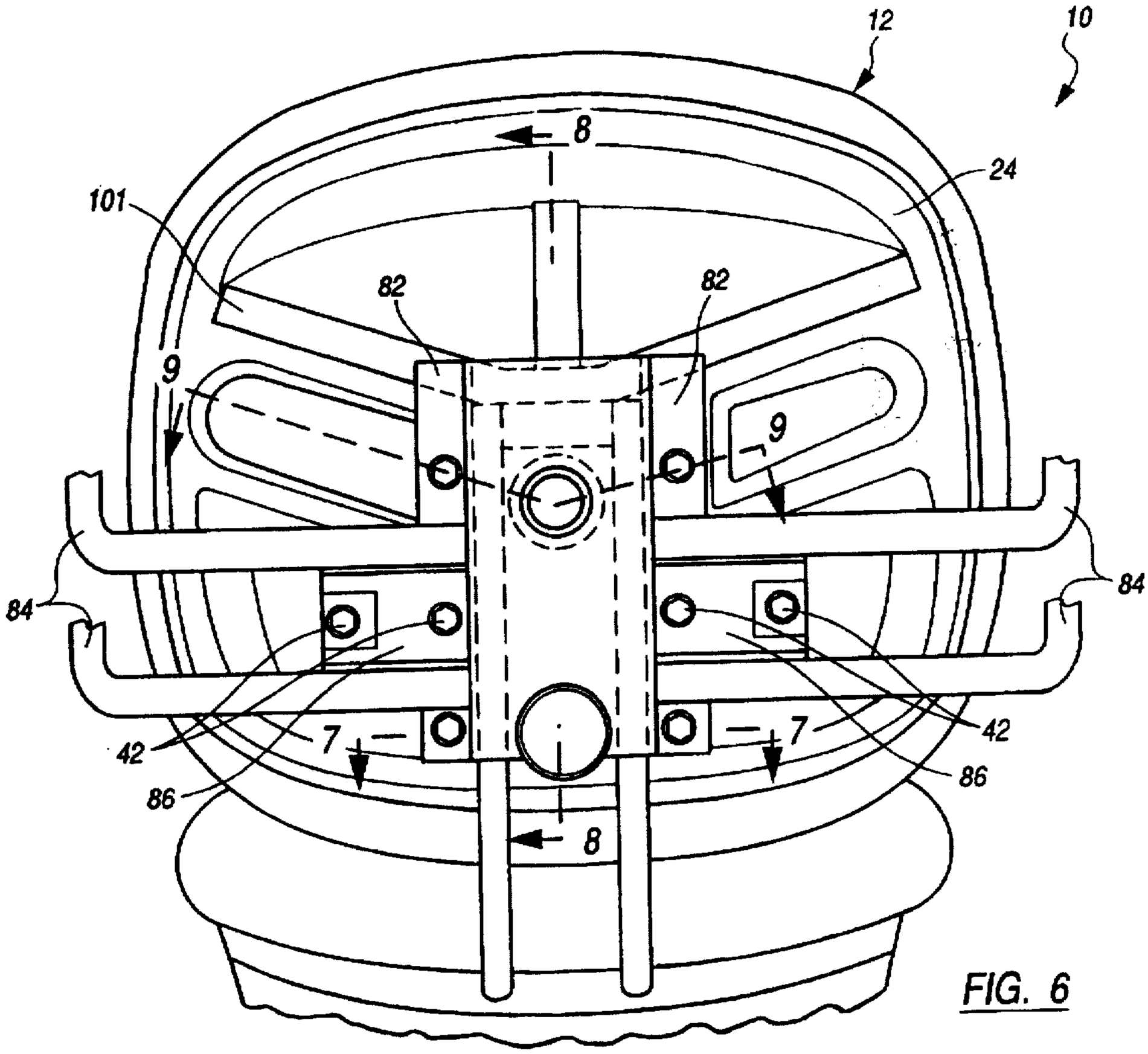
12
10
8
24
101
82
82
9
9
84
84
42
42
7
7
86
86
8

FIG. 6

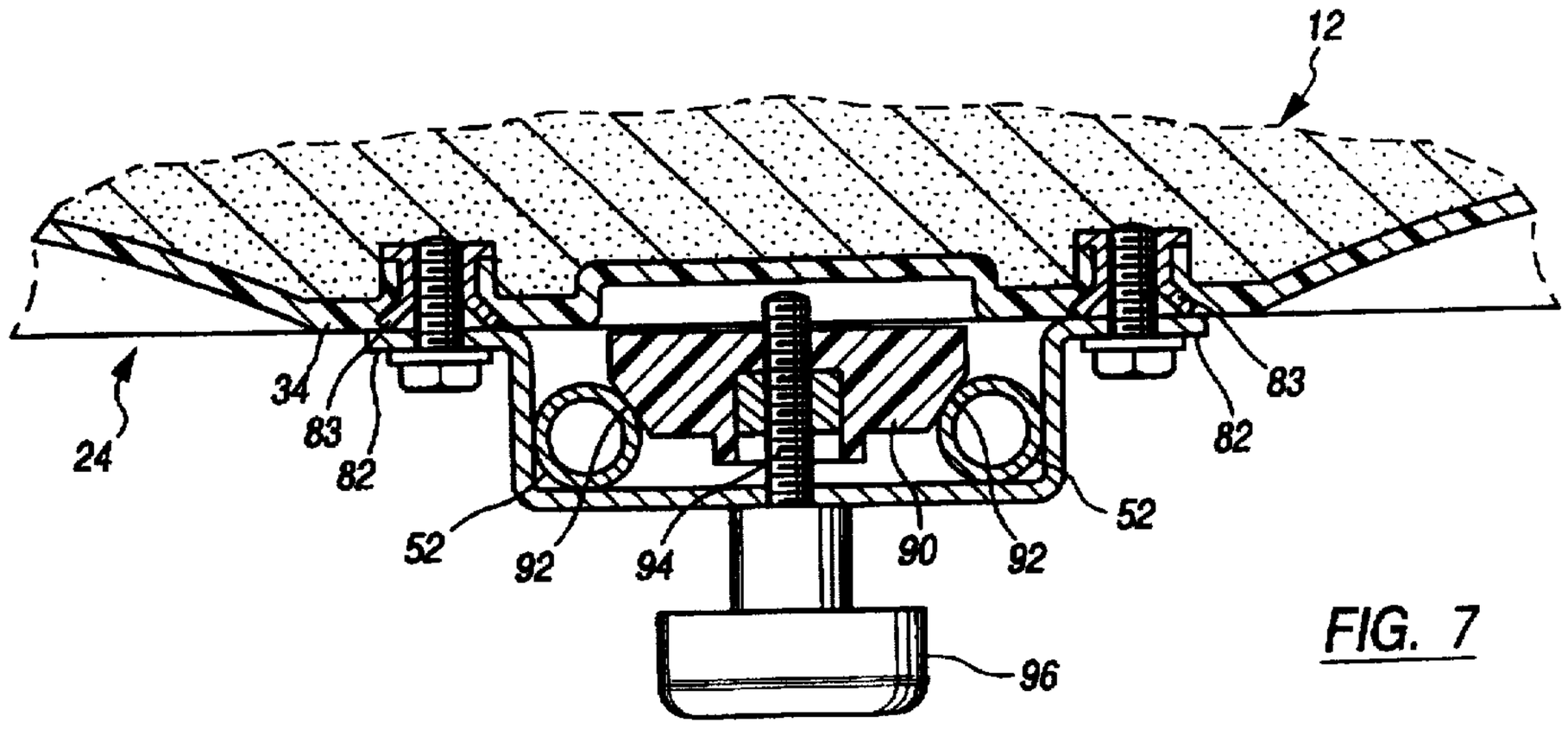
12
24
34
83
82
83
82
52
52
92
94
90
92
96

FIG. 7

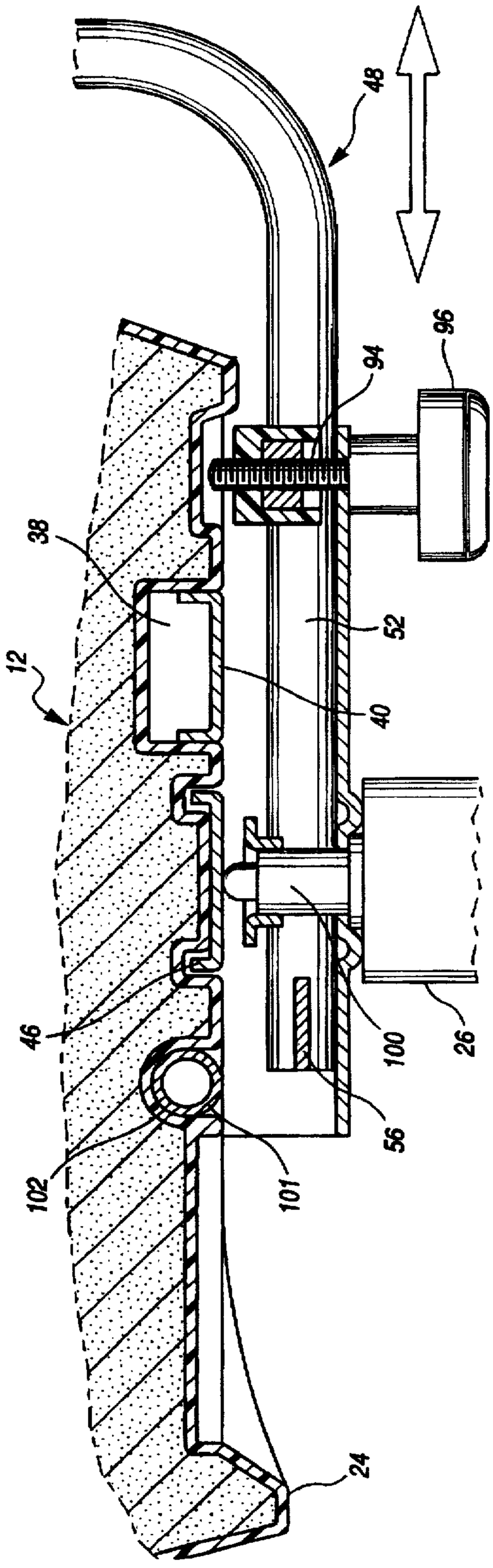
48
96
94
38
52
12
40
46
100
26
56
102
101
24

FIG. 8

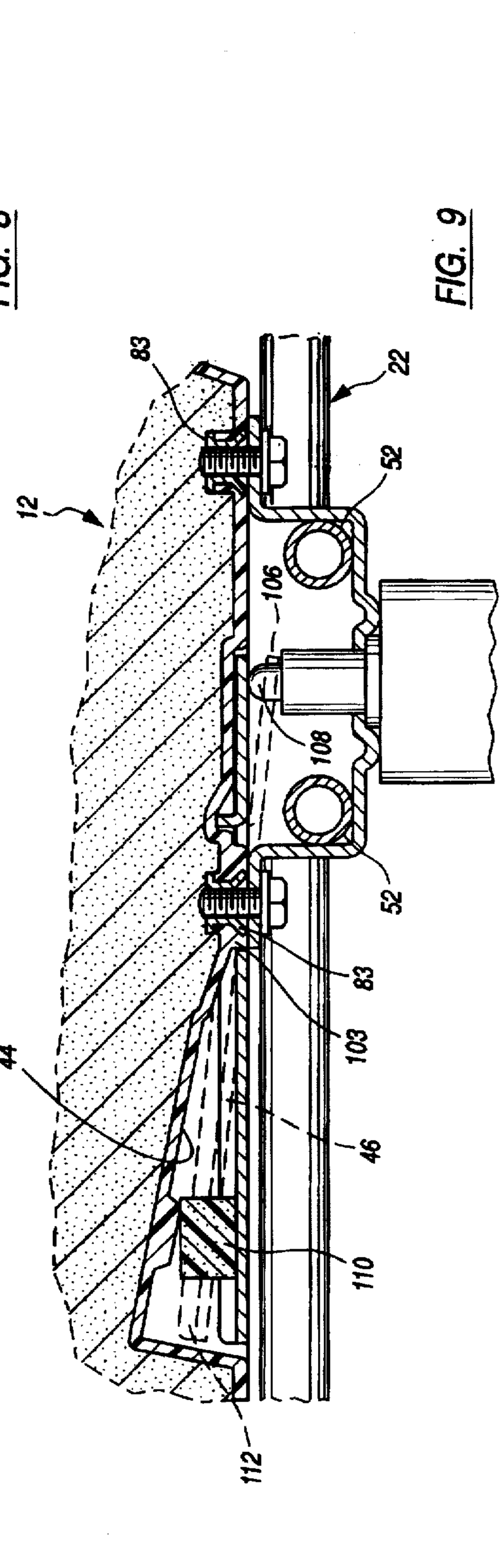
83
22
52
12
106
108
52
83
103
44
46
110
112

FIG. 9

BACK HEIGHT ADJUSTMENT MECHANISM FOR A CHAIR

This application is a divisional of U.S. patent application Ser. No. 08/375,645, filed on Jan. 20, 1995, now U.S. Pat. No. 5,542,743.

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates generally to task chairs of the type used in office environments, for example, and it relates more specifically to a novel construction of a task chair which is highly functional and which is easily manufactured and assembled.

2. Description of the Prior Art

Numerous constructions of task chairs of the type used in office environments, for example, are known. A typical task chair has a cushioned seat and relatively low back. The chair is usually supported on a base having a plurality of casters to allow the chair to be easily moved about the work space. The chair may or may not have arms and other features such as adjustable seat and back height. Generally, known task chairs are of relatively inexpensive and lightweight construction.

The seat of the prior art chair now under consideration is typically an assembly of an upholstered foam cushion secured to a wood or injection molded plastic. The frame is bolted to a control bracket secured to a chair base. If the chair has an adjustable seat height feature, an actuator lever typically extends outwardly from the control bracket, surface mounted on the seat frame. In addition, if the chair has arms, the arms are typically supported by frame members surface mounted to the seat frame. If the chair has an adjustable height back, the mechanical adjustment mechanism is often exposed thereby detracting from the appearance of the chair. The use of a wood or injection molded seat frame with levers and arm frames surface mounted thereon can create a chair construction having an undesirable appearance because the various mechanical parts are exposed.

Accordingly, it is desirable to provide a task chair having an adjustable seat height feature in which an actuator lever is concealed. It is further desirable to provide a task chair having arm supports which are secured to the seat frame in a sturdy but essentially concealed manner. Still further it is desirable to provide a task chair having a back height adjustment mechanism which is reliable in use and also aesthetically pleasing in appearance. Even further it is desirable to provide a task chair which is economical to manufacture and which can be shipped in unassembled condition because it is easy to assemble at its destination.

SUMMARY OF THE INVENTION

The present invention overcomes the disadvantages of the prior art by providing a chair having a seat assembly which includes a blow molded seat support member. The support member has a central planar portion for attachment of a control bracket. A transverse recess is formed in the planar portion beneath the control bracket and receives a cross brace. A pair of arm support frames are secured to the ends of the cross brace and to the control bracket by screws. The arms are, therefore, easily assembled to the chair with the cross brace substantially concealed from view.

In another aspect of the invention, a pedestal is secured to the control bracket and contains a gas cylinder for raising and lowering the seat assembly. Another recess formed in the seat support member receives an actuating lever for actuating the gas cylinder. The actuating lever is substantially flush with the surface of the support member and thus is concealed from view.

In yet another aspect of the invention the chair is provided with a seat back adjustment mechanism for adjusting the outward position of the back relative to the seat. The adjustment mechanism comprises a pair of parallel spaced tubular members connected to the seat back and telescopingly received by the control bracket. A bolt extending through the control bracket cooperates with a clamp bar to clamp the tubular members to the control bracket.

Still another aspect of the invention relates to an adjustable height chair back wherein a blow molded back support member is provided with wedge-shaped channels for receiving a pair of tubular members of a back support frame. The tubular members may be adjusted to a variety of positions within the channels and clamped therein by a single bolt.

BRIEF DESCRIPTION OF THE DRAWINGS

The foregoing and other novel features of the invention will be better understood upon a reading of the following detailed description taken in conjunction with the accompanying drawings wherein:

FIG. **1** is a side perspective view of a task chair constructed in accordance with the present invention;

FIG. **2** is an exploded perspective of the task chair showing the construction of the underside of the seat;

FIG. **3** is an exploded perspective view of the rear of the seat back;

FIG. **4** is a perspective view of the rear of the seat back in assembled condition;

FIG. **5** is a partial cross-sectional view taken substantially along the line **5—5** of FIG. **4**;

FIG. **6** is a bottom plan view of the chair;

FIG. **7** is a partial cross-sectional view taken substantially along the line **7—7** of FIG. **6**;

FIG. **8** is a partial cross-sectional view taken substantially along the line **8—8** of FIG. **6**; and

FIG. **9** is a partial cross-sectional view taken substantially along the line **9—9** of FIG. **6**.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now to the drawings, and initially to FIG. **1**, a task chair constructed in accordance with the invention is designated generally by the reference numeral **10** and includes a seat assembly **12** and a back assembly **14**. In the embodiment illustrated, the seat assembly **12** and back assembly **14** include cushions, **16** and **18** respectively, covered by a suitable fabric. Arm pads **20** are supported by tubular frames **22**. A seat support member **24**, which will be described in detail hereinafter, is supported on a pedestal **26** which in turn is connected to a base **28**. The base **28** comprises a plurality of legs **30** each fitted with a suitable castor **32** for ease in moving the chair **10** about the work space.

FIG. **2** shows the underside of the chair **10** in exploded perspective. As seen therein, the seat support member **24** of the seat assembly **12** is blow molded from a suitable plastic and is formed with a central generally planar portion **34** to which a control bracket **36** is bolted. The control bracket **36** spans a transverse recess **38** in the support member **24**. The

recess **38** receives a cross brace **40** to which the arm frames **22** are connected by bolts **42**. Another recess **44** is formed in the support member **24** leading from the center of the planar portion **34** to an edge of the support member **24**. The recess receives an actuator lever **46** for purposes of which will be described hereinafter. The seat back assembly **14** is supported on the seat assembly **12** by a frame **48**. A cover **50** is provided for the rear surface of the back assembly **14**.

Turning now to FIGS. **3**, **4** and **5**, the seat back assembly **14** can be seen to have an adjustable height feature provided in part by a support frame **48** which includes two parallel spaced tubular members **52**. The tubular members **52** are bent through approximately ninety degrees and are connected on first legs by a plate **54** and at opposite legs by a cross bar **56**. The back assembly **14** in accordance with the invention includes a back support member **60** blow molded from a suitable plastic and formed with a pair of channels **62** running vertically from the lower edge of the support member **60**. The channels **62** are spaced in such a manner as to slidingly receive the tubular members **52** of the frame **48**. As best seen in FIG. **5**, the channels **62** have wedge-shaped side walls **64**. A bolt **66** capped by a knob **68** extends through the plate **54** and is threadedly received by a suitable fastener **70** molded into the back support member **60**. A vertical slot **72** is provided in the plate **54** such that the back assembly has limited vertical movement relative to support frame **48**. When the bolt **66** is screwed into the fastener **70**, an inner cylindrical portion **68***a* of the knob **68** bears against the plate **54** forcing the tubular members **52** into wedging engagement with the side walls **64** of the channels **62** thereby locking the back support member **60** to the frame **48** at a desired vertical position.

The cover plate **50**, which may be of metal or molded plastic construction, extends across the rear of the back support member **60**. This cover **50** is held in place at the top by a tab **74** and slot **76** formed in the support member **60** and at the bottom by a collar **78** formed integral with the cover **50** and received within an annular recess **68***b* formed in the knob **68**. Suitable S-clips **77** may be used to retain the tab **74** within the slot **76** (see FIG. **2**). The tubular members **52** of the frame **48** exit from beneath the cover **50** through slots **80** provided in the lowermost edge of the cover **50**. Thus, the cover **50** covers the entire back of the support member **60** completely concealing the height adjustment mechanism. As best seen in FIG. **3**, the upper legs of the tubular members **52** of the frame **48** are received within apertures **81** of the support member **60** and telescope therein to give the back assembly **14** added support by the frame **48**.

Turning now to FIGS. **6**, **7** and **8**, the details of the seat support member **24** can be seen in enlarged illustration. The control bracket **36** has a generally C-shaped cross-section with a pair of opposed outwardly extending flanges **82** for mounting the bracket **36** to the planar portion **34** of the support member **24** by suitable fasteners such as clinch nuts **83**. The arm frames **22** comprise a pair of tubes **84** joined at their lowermost ends by webs **86**. The bolts **42** fasten the webs **86** to the support member **24** through threaded holes in the cross brace **40** which is positioned in recess **38** beneath the control bracket **36** and beneath the webs **86**. For added strength, the spacing of the holes in the cross brace **40** is such that the ends of the arm tubes **84** and associated webs **86** butt up snugly against the respective sides of the control bracket **36**.

In accordance with the invention, the seat back **14** of the chair **10** has an out-back adjustment feature which permits the back **14** to be adjusted horizontally with respect to the seat **12**. With reference particularly to FIGS. **7** and **8**, this feature is accomplished by the telescoping relationship of the back support frame **48** within the control bracket **36**. The spacing of the tubular members **52** of the back support frame **48** is such that the members **52** slide in close proximity to the side walls of the control bracket **36**. Once the desired out-back position is selected, a clamp bar **90** having ramp surfaces **92** (FIG. **7**) is drawn tightly against the tubular members **52** by a bolt **94** connected to a knob **96** which extends through an aperture in the control bracket **36**. The clamp bar **90** thereby urges the tubular members **52** into engagement with the interior walls of the control bracket **36** and clamps the members **52** securely thereto. In order to inhibit accidental removal of the frame **48** from the seat assembly **12**, the tubular members **52** extend forwardly of gas cylinder **100** and are joined thereat by cross bar **56**. Thus, cross bar **56** acts as a stop against the cylinder **100** to prevent complete removal of the frame **48** from the control bracket **36**. In order to provide increased support for the seat assembly **12**, the control bracket **36** is provided at its forward end with a V-shaped cross tube **101**, connected thereto as by welding. The cross tube **101** fits snugly within a V-shaped recess **102** formed in the support member **24** (FIG. **2**).

The chair **10** of the preferred embodiment also has an adjustable seat height feature as best shown in FIG. **9**. Disposed within recess **44** of the seat support member **24** is actuator lever **46**. A boss **103** formed on the member **24** acts as a fulcrum for pivotable movement of the lever **46**, the boss **103** cooperating with an aperture **104** in the lever **46**. One of the bolts which fasten the control bracket **36** to the support member **24** cooperates with the boss **103** to trap the lever **46** in position within the recess **44**. The lever **46** extends from the center of the control bracket **36** to an edge of the seat **12** and as thus installed, the proximal end **106** of the lever **46** actuates a button **108** on the top of the gas cylinder **100**. A resilient foam member **110** may be used to bias the lever **46** to an unactuated position. The gas cylinder **100**, which is of conventional well-known design thereby provides for raising and lowering of the seat assembly **12** on the pedestal **26** upon actuation of the lever **46**. The user of the chair may operate the lever **46** by reaching under the seat and by manipulating the distal end **112** of the lever against the force of the foam member **110**. The use of a foam member **110** also reduces rattling of the actuator lever **46**.

It can now be appreciated that the chair **10** of the present invention provides a highly functional yet readily manufactured structure. Moreover, because of the concealed nature of the seat height adjusting lever **46** and the back height adjusting mechanism, the chair has a simple, aesthetically pleasing overall appearance. The chair **10** is also easy to assemble and, therefore, can be readily shipped in disassembled condition for better ease of shipment.

While the present invention has been described in connection with a preferred embodiment thereof, it will be understood by those skilled in the art that many changes and modifications may be made without departing from the true spirit and scope of the invention. Accordingly, it is intended by the appended claims to cover all such changes and modifications which come within the true spirit and scope of this invention.

What is claimed is:

1. An adjustable height back for a chair comprising:

a unitary molded back support member defining a main body member of a back of a chair

a frame for connecting the back support member to the seat of a chair, the frame including a pair of parallel

spaced tubular members connected by a plate, said plate being provided with a vertical slot;

a pair of channels formed in the back support member, the channels having wedge-shaped side walls and being dimensioned and configured to slidingly receive the tubular members; and

a bolt extending through said slot and into a threaded recess of the back support member;

wherein tightening of said bolt urges the tubular members into engagement with the side walls of the channels to clamp the tubular members directly to the back support member.

2. The adjustable height back of claim 1 further including a cover for covering the channels in the back support member.

3. The adjustable height back of claim 2 wherein the tubular members exit the cover along a bottom edge of the cover.

4. An adjustable height back for a chair comprising:

a molded back support member;

a frame for connecting the back support member to the seat of a chair, the frame including a pair of parallel spaced tubular members;

a pair of channels formed in the back support member, the channels having wedge-shaped side walls and being dimensioned and configured to slidingly receive the tubular members;

means for urging the tubular members into engagement with the side walls of the channels to clamp the tubular members to the back support member; and

a cover for covering the channels in the back support member, the cover having a tab cooperable with a slot of the back support member to retain the cover in fixed disposition on the back support member.

* * * * *